REMARKS

In the Office Action mailed December 14, 2004, the Examiner noted that claims 1-20 were pending, and rejected claims 1-20. Claims 1-20 remain pending for reconsideration which is requested. The Examiner's rejection is traversed below.

Page 2 of the Office Action rejects all claims under 35 U.S.C. § 103 over Liou and Kim.

The Examiner asserts that Liou teaches a Gaussian model estimator and acknowledges that Liou does not teach a CDF calculator or a histogram equalizer as called for in the claims (see Action page 2). The Examiner asserts that Kim teaches and suggests these features.

The present invention of claims 1, 7, 11, 15 and 20 is directed at equalizing an histogram (a representation of a frequency distribution). The Examiner compares this feature to the discussion of Kim regarding figure 4 at column 9, lines 19-28 which states:

> A CDF memory 312 renews the cumulative density functions cL (Xk) and cU (Xk) calculated by the first and second CDF calculators 308 and 310 in frame units according to a synchronous signal (SYNC), and provides the previously stored prior-to-one-frame cumulative density functions cL (Xk) and cU (Xk) to first and second mappers 316 and 318 during renewal, respectively. Here, the synchronous signal is a field synchronous signal when the picture unit is a field, and is a frame synchronous signal when it is a frame. The CDF memory 312 is used as a buffer.

(Kim, col. 9, lines 19-28)

This portion of Kim discusses providing the CDFs to mappers. Kim describes the mappers as:

> Meanwhile, the first mapper 316 shown in FIG. 4 receives the cumulative density function cL (Xk) calculated by the first CDF calculator 308, the signal (Xk) output from the first noise reducer 200, and the compensated mean level (Bm) output by the brightness compensator 314, and maps the samples {X}L of the first subimage to a gray level ranging from 0 to Bm according to the cumulative density function.
> The second mapper 318 receives the cumulative density function cU (Xk) calculated by the second CDF calculator 310, the signal (Xk) output by the first noise reducer 200, and the compensated mean level (Bm) output by the brightness compensator 314, and maps the samples {X}U of the second subimage to a gray level ranging from Bm ' to X.sub.L-1 according to the cumulative density function.

(Kim, col. 10, lines 5-18)

> a first mapper for mapping said noise-reduced luminance signal output by said frame memory to a gray level having a first range according to a corresponding cumulative density function value

(Kim, col. 20, lines 39-41)

> a second mapper for mapping said noise-reduced luminance signal output by said frame memory to a gray level having a second range according to a corresponding cumulative density function value

(Kim, col. 20, lines 44-47)

As can be seen, the mappers map from luminance to gray level. There is no histogram frequency distribution associated with the Kim mappers much less performing histogram equalization.

It is submitted that the present invention is not taught or disclosed by the prior art for the above discussed reason and withdrawal of the rejection is requested.

The present invention calls for an estimator that uses a Gaussian model (claims 1, 7, 11, 15 and 20) and, in some claims, for storing error function values based on a Gaussian distribution. That is, a Gaussian is used for two things, estimation and error values. The Examiner points to Liou, column 9, lines 60-65 for both of these features. The Examiner particularly notes that Liou discusses an error function particularly noting the "difference signals" (see Action, page 3) and points to the Liou discussion noted above which states:

> An alternative model for frame difference signals is that the corresponding difference dij (=fnij -f.n-1ij) at pixel location (i, j) follows a zero-mean Gaussian distribution with variance .sigma..sup.2.sub.ij. The unknown parameter .sigma ij can be estimated from the image sequence directly. To simplify the model, it is often assumed that the random variables are i.i.d. (independently identically distributed), therefore.

(Liou, col. 9, lines 60-65)

This discussion in Liou does not discuss producing an estimation using a Gaussian model much less teach or suggest same.

It is submitted that the present invention is not taught or disclosed by the prior art for this additional reason and withdrawal of the rejection is requested.

As noted above, Kim does not disclose the features of the invention. That is, determining the degree of enhancement of the contrast and calculating CDF based on an error function are not disclosed by Kim. The Examiner asserts that col. 8, lines 62-67 of Kim discusses that the CDF is calculated using an error function. However, this assertion appears to be misplaced as these lines of Kim are not concerned with an error function but with a PDF. That is, Kim calculates CDF using PDF.

Further Liou uses an error function to calculate a correlation between frames. If two frames belong to different shots, the distribution of a difference signal between the two frames is very different from a standard Gaussian error function. A correlation between two frames can be calculated using an error function as in Liou but Liou does not disclose calculating a CDF using an error function as in the present invention.

Additionally, there is no motivation to combine Kim and Liou because Kim and Liou are different in object, structure and effect. Also the error function in Liou cannot be adapted to the teachings of Kim because Kim does not describe calculating a CDF using an error function.

It is submitted that the present invention is not taught or disclosed by the prior art for these additional reasons and withdrawal of the rejection is requested.

As discussed above, the prior art does not teach or suggest producing an estimation using a Gaussian model, as a result, the prior art does not teach or suggest performing a CDF calculation with such as estimation as called for in claims 1, 7, 11, 15 and 20.

It is submitted that the present invention is not taught or disclosed by the prior art for this further reason and withdrawal of the rejection is requested.

It is submitted that the invention of independent claims distinguishes over the prior art and withdrawal of the rejection is requested.

The dependent claims depend from the above-discussed independent claims and are patentable over the prior art for the reasons discussed above. The dependent claims also recite additional features not taught or suggested by the prior art. For example, claim 4 calls for the CDF calculator to use a Gaussian distribution that has a zero mean and a unit variance. The Examiner points to Liou for this feature. However, as acknowledged by the Examiner Liou does not teach or suggest a CDF calculator. Rather, it is Kim that the Examiner relies on for a CDF calculator (see Action page 2) and Kim does not teach or suggest the features of claim 4. It is submitted that the dependent claims are independently patentable over the prior art.

It is submitted that the claims are not taught, disclosed or suggested by the prior art. The claims are therefore in a condition suitable for allowance. An early Notice of Allowance is requested.

If any further fees, other than and except for the issue fee, are necessary with respect to this paper, the U.S.P.T.O. is requested to obtain the same from deposit account number 19-3935.

Respectfully submitted,

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